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Efficacy of Prophylactic Mouth Rinses on Reducing Oral Levels of SARS-CoV-2

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Abstract

Mouthwashes has been used for preventing causes for many years, mostly by the patients before any treatment and surgery, nowadays with Covid-19 pandemic there has been an increase in the preoperative use of mouthwashes by the patients to decrease the viral load of oral cavity, but dentists can also use the benefits of mouthwashes themselves by using them after the procedures to clear their mouths and the path of the Sars-cov-2.

Keywords: Chlorhexidine; Hydrogen peroxide; Iodopovidone; Covid-19; Prophylaxis

Introduction

Oral rinses have been used as an industry standard in dentistry for decades to reduce oral levels of pathogens including bacteria and viruses. According to the American Academy of Dentistry mouth rinses can be broken down into two categories, cosmetic and therapeutic. Those categorized as therapeutic include chlorhexidine, essential oils, fluoride, and hydrogen peroxide. These rinses are routinely used in both dental practices as well as in the OR setting prior to any invasive procedure involving treatment of the oral cavity. However, these mouth rinses, are typically utilized to reduce risk of infection to the patient. By disinfecting the oral cavity through bacteriostatic, bactericidal, and virucidal rinses practitioners can mitigate the risk of spreading an infection from a patient's mouth or the outside environment to other parts of their body. Prophylactic rinses are often used prior to routine dental procedures like fillings and cleaning to more invasive interventions like jaw reconstruction and tumor resection. This simple, cheap and innocuous procedure is now being used for a different purpose. In light of the COVID-19 pandemic, reduction in the spread of oral and respiratory borne viruses has become paramount in the global battle against coronavirus. Both dentists and medical providers, including ear nose throat specialists and anesthesiologists who routinely intubate patients, have implemented the use of these virucidal mouth rinses to reduce viral loads of both COVID-19 positive and non-infected patients. Dentists are particularly at risk for transmission of COVID-19 because they work directly in the oral cavity where the virus resides and the work, they do creates an enormous amount of aerosols. In addition to a multitude of barrier and personal protective equipment (PPE) techniques being implemented, prior to procedures in the oral cavity patients are asked to

rinse and spit different regimens of mouth rinses to reduce the chance of spreading SARS-CoV-2 to healthcare staff **[1-4]**.

The use of mouthwashes has shown that they can reduce the viral load of Covid-19, with the most promising mouthwashes containing hydrogen peroxide (H2O2). Cetylpyridinium chloride (CPC), povidone iodine (PVP-I) and chlorhexidine gluconate (CHX). **[1]** Since Sars-Cov-2 is transmitted by airborne droplets and the respiratory tract is the main route of infection, having a way to clear this pathway can ensure that the practitioner does not contract Covid-19 in their patients. In response to SARS-CoV-2 the dental and greater healthcare communities have devised ways to combat the spread of the virus, many dentists and physicians have advocated the use of prophylactic oral rinses for reduction of COVID-19 viral load in all patients prior to treatment in the oral pharyngeal cavity, but the effectiveness of these measures has not been validated with empirical evidence. We will test COVID-19 positive hospital inpatients before and after the use of different combinations of oral rinses to provide guidance on best measures for dental or medical treatment. **[1-5]**.

Discussion

1.1 Chlorhexidine (CHX)

CHX is a wider-spectrum antiseptic that has an action on Gram-negative and Gram-positive facultative anaerobes, fungi, bacteria, and aerobes by increasing the bacterial cell wall permeability, then causing its cell lysis. **[2,3]** It is mainly used in destistory procedure to treat periodontal disease and reduce dental plaque **[4]**.

Evidence shows that an in-vitro consequence against lipid-enveloped viruses like herpesvirus 1, influenza A, cytomegalovirus, hepatitis B and parainfluenza virus. **[5]** Even though COVID-19 is virus with an envelope, 0.12% CHX gluconate was recommended to have no or little effect against coronaviruses when associated with other type of mouthwashes. **[6,7,8]** On the other hand, Yoon et al **[9]** shown that SARS-CoV-2 suppression for two hours after consuming 15 ml 0.12% CHX once, suggesting that its application would be helpful for the transmission of control of COVID-19.

1.2 Hydrogen peroxide (H_2O_2)

Since the turn of the century, H_2O_2 has been used in dentistry in salt combination or alone since the turn of the century. **[10]** Like a mouthwash, it is a clear, colorless, odorless liquid. **[11]** No adverse effects on soft tissue have been shown in many studies using 1% –1.5% H_2O_2 as a daily rinse over two years of follow-up. **[12,13]**

In the study of in vitro study that 3% H_2O_2 entirely inactivates type 4 adeno-associated viruses, influenza A and B, 1B and 7 rhinoviruses, type 6 and 3 adenoviruses, type 1A, mixoviruses, respiratory syncytial virus with a long-term strain, and the coronavirus strain 229E within 1-30 minutes, the study shows that influenza virus and coronaviruses were the most subtle. **[14]** Because SARS-CoV2 is susceptible to oxidation, pre-procedure mouth rinses containing oxidizing agents like the 1% H_2O_2 h should have reduced viral load in saliva. **[6,15]**

1.3 Iodopovidone

Povidone Iodine (PVP-I) is a iodine water-soluble mixture that is widely used as a preoperative mouthwash and skin antiseptic. **[16]** It is commonly used at a concentration of 1% **[17]** to treat mucositis, prevent ventilator-associated pneumonia and prevent oropharyngeal infections. Its antimicrobial effect is manifested after free iodine dissociates from polyvinylpyrrolidone, then iodine quickly penetrates microbes, destroying proteins and oxidizing nucleic acid structures, causing the death of microbes. **[18,19]** Prior studies have shown that PVP-I is more virucidal than other commonly used antiseptics, including benzalkonium chloride and CHX. **[20]** It is nontoxic, reporting a incidence of 0.4% of allergy cases **[21]**, does not cause or taste disturbance and tongue or tooth discoloration **[22]** and, nothing like alcohol-based products, can be used along with electrocautery. **[23]** Its efficiency has been well revealed in many studies of in vitro against several viruses, including and influenza A (H1N1) virus SARS-CoV, and MERS-CoV. **[16,20,24]** Recent studies have shown that 0.23% PVP-I mouthwash perform procedure for at least 15 seconds before can reduce viral load in saliva **[24]**, representing its procedure in COVID patients -19. **[6,18,25,26]**

Effectiveness of mouthwash on viral load

The Centers for Disease Control and Prevention (CDC) has long suggested taking advantage over mouthwash in reducing airborne pathogens of all kinds prior to clinical procedures **[27]**. During this global pandemic, given the encounters associated with dispatching dental procedure, attention has been drawn to the potential use of mouthwashes to reduce and prevent SARS-CoV-2 transmission.

Conclusion

Mouthwashes are an effective way to reduce the transmission of viruses that infect the respiratory tract. As oral cavities are a major source of entry and transmission for human coronaviruses, so mouthwashes are the preventive measure to reduce the risk of COVID-19. Mouthwashes, especially PVP-I, are a potential antiviral that can significantly minimize viral load in saliva and then aerosols, thereby reduce the spread of COVID-19 infection. However, there is paucity of literature and, as a result, a lack of knowledge among dental practitioners about the value of using mouthwashes. Consequently, there is a great need for more clinical trials in order to take a step forward in clinical practice.

Clinical significance

The preventive use of mouthwashes by the dentist may decrease the chance of transmission Covid-19 from the patients to them.

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